Iroquis probably knew very little until they had them from the whites. In the eastern part of the State the case was reversed. Small shell beads, made by Indian and not by white methods, are quite rare. They are drilled from both ends, and I have seen very few. In Cayuga County, however, some very large beads have been found which may be early. All known wampum belts are modern. Once introduced, the Iroquois used beads lavishly, and recent gorgets, beads, and ornaments of shell are frequent. Bone and horn were used earlier, and were favorite materials with the Iroquis. Ornaments made of perforated skulls appear in Jefferson County, and carved bones and horns in other places. After the Iroquis obtained knives and saws they did some tasteful work in this way. Quite handsome combs were made, usually symmetrical. Some unfinished examples show how they were made. Just before European trade vigorously commenced, they formed a few barbed fish-hooks, but I have known but four of these. The hook with the knob, but without the barb, is earlier, and quite rare. I think the barb came from a knowledge of the white man's hook, especially as one of these was from a place occupied about A.D. 1600. The four hooks were found respectively in Canada and Jefferson, Madison and Onondaga Counties. Harpoons of bone or horn are mostly recent, though not invariably. They were used by the Iroquois. Recent ornaments of bone are conventional or realistic. Mingled with them are Venetian, porcelain, and glass beads, and all kinds of trinkets. Jesuit rings have a prominent place.

Earthenware.—Most villages, and many camps, have afforded much earthenware, occasionally found entire in graves. Vessels are sometimes quite large, and often beautifully ornamented with dots and lines. Pottery is valuable in connecting sites. On a few vessels, three or four dots inside of a diamond or triangle, suggest the human face. Human faces or figures at the angles of earthen vessels, were in fashion among the Onondagas and Mohawks late in the sixteenth and early in the seventeenth centuries. The fashion lasted about thirty years, but this absolutely fixed the age of two important sites. These figures also have peculiarities connecting them with other styles, and are usually symmetrical, but in one Mohawk example one hand is raised, and the other turned down. Pipes often suggest a similar connection, or reveal striking individuality. A series of curious many-faced pipes from one neighborhood, could have been made by only one man, and others, far apart, have a similar personality. Raised figures are common on Iroquois pipe bowls; but in the earlier ones they face the smoker, in the later they are turned from him. In one instance a spirited panther's head is turned to one side. This was from a grave of the transition period, which had another with an eagle turned from the smoker. Pipe stems are often ornamented with lines and dots, and others have projecting lines running along both sides. The variety is endless. The English freely distributed the common white pipes, and they appear on most recent sites. Sometimes they are found of pewter, brass, or iron.

Among modern pipes I have an Indian one made from an immense deer's antler, which is well carved, and was finely painted in its day. Detached ornaments of terra cotta are sometimes quite artistic, and may represent the whole or some part of bird or beast. Such things must be looked for only in cemeteries or villages. It is a mistake, however, to expect relics in all graves, for scores of early tombs have been opened which had no trace of any article. Equally erroneous will it be to look for fixed modes of burial. They varied greatly within a limited space and time. One occurs to me where a young person of distinction was interred head downward.

Some of the finest articles have been found at a distance from villages and camps; often in low places, as though lost in hunting or war. This reminds me that the common opinion that broken implements necessarily indicate battle fields, is another error. In villages they were often broken accidentally, but in the great New Year's feast of the Iroquois and Hurons, wholesale destruction might be a matter of course.

I have seen a few beads of baked clay, as well as of stone. The latter are formed from fossils. In one case, in Cayuga, a fossil shark's tooth had become an arrow, and curious stones have often been slightly worked to increase a primary resemblance. A few counters of bone or clay —the latter sometimes made from broken earthenware— have been found on Onondaga sites, probably used as in the peachstone game. In this game, of course, other materials were at first used; perhaps the deer buttons which are not yet laid aside.

It may be remarked that while knives and punches were used in decorating vessels, some ornaments were formed simply by pinching the clay on the sides of vessels, and on some fragments the impression of the thumb and finger plainly remains. Traces of basket work are rare.

SARCOLOGY: A NEW MEDICAL SCIENCE.

BY WALLACE WOOD, M.D., PROFESSOR IN THE UNIVERSITY OF THE CITY OF NEW YORK.

THE recent experiments of Brown-Séquard and Dr. Hammond in injecting extracts of flesh into the blood, go to show that there may be a science of the organism, which is neither anatomy nor physiology, nor yet histology nor chemistry, and yet which may be founded upon facts and laws as sound as those upon which are based its sister sciences.

The elements with which chemistry deals are atoms and molecules; histological elements are cells, fibres, membranes and tissues; anatomy describes organs and systems; while morphology conducts the mind to higher combinations, such as antimers and metamers, the person, the couple, and the colony, the individual, and the race.

Sarcology discarding all forms and tissues, comes down, as it were, with blows of the hammer upon the solid and naked flesh, driving it down to a hard basis. It reduces this flesh to pulp, and with such pulp seeks to reconstruct the organism. In Brown-Séquard's laboratory we have brain juice and testacular juice; from Dr. Hammond we receive scientific elixirs of life labeled Cerebrine, Cardine, Teotine. Inject these into the river of life, the *milieu interne*, and each goes to its proper part and reconstructs it.

How many kinds of flesh are required to make man? Four; one for each kind of life force. One to bear the strain of each of the cardinal forces, excitation, motion, growth, production.

These forces work through nerve, muscle, vessel, and gland.

These powers are radical or elementary. In organic life there is a nervous or excitative tendency, a muscular or motor tendency, a vascular or tubular tendency, which is toward nutrition, construction, growth, and a glandular or epithelial tendency, toward efflorescence, effusiveness or production. Nerves are the agents of excitation, muscles are motor agents, tubes are the agents of construction, glands and parenchymes or epitheliums are the agents of effusion, efflorescence and productivity.

The science of sarcology rests upon the foundation of the four radical parts of the organism, the four elementary kinds of flesh. If any one is in doubt concerning the doctrine, let him dissect the serpent, a vertebrate comparatively simple, and the one best generalized. I

have spent two summers in this kind of work and have found it most profitable.

Examine the serpent in the embryo first. One easily defines four long lines thus:

1———————
2———————
3———————
4———————

The first is a white line of nerve flesh, the second a livid line of muscular flesh, the third a red line of vascular flesh, and the fourth a yellow line of glandular flesh.

In the adult these four radical elements appear also in long lines, and one forgets to look for details of organs and functions, for he sees before him a grand generalization made by nature herself. Here is the long white line of nerve, the flesh of excitation, next a gross elongate contractile mass, say three feet in length, the motor flesh, two long tubes, one alimentary the other sanguiniferous, nutritive tubing, constructive flesh, and finally a chain of elongate soft masses, each serpent-shaped, lung, liver, kidney, ovary, constituting the effusive or productive flesh.

Each of these being reduced to impalpable powder, if made into extracts, we would have serpent neurine, musculine, vasculine, glanduline.

Presumably we must take it for granted that the flesh of the serpent is not appropriate for human veins, as we do not put it into the human stomach, though we do that of the turtle, but the simplicity of the organism makes it a most delightful subject for the man of science to contemplate. Along that white nervous line lies the brain, the soul, the spirit of the creature, the power of excitement; by theory injected into the veins of other creatures it ought to raise the spirits and the power of excitement. Along the livid contractile line lies the muscular power. In the third, or vascular line, we find the heart and the vitality. Injection of this flesh should increase vitality, the power of living and growing,—a serpent, like a cat, dies hard. The heart and intestines of felines also offer a subject for investigation. In the fourth line, finally, that of the soft and melting flesh, we see the force of effusion and efflorescence, or productivity. Forced feeding of the veins or lacteals with this flesh ought to raise the effusive and productive power.

For purposes of experiment the rabbit would in many places be a more convenient animal than the guinea pig of Brown-Séquard. A number of these animals being provided, the brain and nerves are thrown into the first pile, so to speak, as spirit flesh, the muscles into the second as motor flesh, the heart, veins, arteries and intestines into the third as vital or vigor flesh, and the lungs, liver, kidney, ovaries, testes and mammary glands into the fourth as productive flesh.

These four radical parts being treated by Brown-Séquard's method would produce nerve juice, muscle juice, vessel juice and gland juice. Being treated by Dr. Hammond's process with boric acid, glycerine, and absolute alcohol, the result would be four radical or elementary extracts, neurine, musculine, vasculine, glanduline, calculated respectively to raise the spirits, the energies, the vigor or vitality, and the effusive power.

Each of the grand divisions of the little kingdom of man has its capital or seat wherein each special kind of force is concentrated. The nervous centre is the cerebrum, or highest pair of nerve ganglia; the muscular centre, somewhat less marked in man, is clearly to be distinguished in the breast of wild birds, and in the rump of the cervidæ; the heart is the vascular centre, the seat of vitality and vigor, the culmination of nutritive force; while the germ or sperm glands, or generative flesh, may be regarded as the glandular culmination of the organism.

In these organs, then, brain, breast (of birds), heart and ovaries or testes, we have special concentrations of life's radical forces, excitatory, motor, constructive and generative, and thus, if instead of taking the whole of the flesh for the manufacture of carneous extracts, one selects the concentrated parts, using these alone, he will, in place of making neurine, musculine, vasculine and glanduline, produce cerebrine, pectine, cardine, testine, which thus ought to be a higher essence of the flesh. For these specialized flesh masses in nature present to us the highest examples of force excitant, energetic, constructive and generative.

How to grasp and bottle these forces and with them perform the scientific miracle of transubstantiation, is the question for those who seek an elixir of life, making these flesh masses by means of extracts the vehicles through which to transfer these forces from animals to man.

The ancient Romans were convinced of the truth of the dictum that each part nourishes a part. As an example the udders of cows were eaten by them as emotional food. The science of sarcology and the new way opened up by Brown-Séquard and Dr. Hammond suggest higher possibilities. Who knows but some day we may inject into our veins the breasts of birds and the heart of the lion, as modes of raising human spirits and energies.

HISTORY OF SCIENCE IN AMERICA.

BY JOHN READE, MONTREAL, CANADA.

THE period between 1876 and 1889—the centennial period, it might be called—was the occasion of many retrospects, touching the development of letters, law, the constitution and various branches of science within the Republic. Long before the later limit of this period had been reached, the eyes of students had begun to contemplate, with admiration, an anniversary of still more pregnant suggestiveness, and surveys covering the interval between the Columbian discovery and the present have begun to appear. In an age of specialists, such as ours, comprehensive records of progress, like those of Drs. Whewell and Draper, are going out of fashion. Where they survive, they mostly take the cyclopedic form, each contributor dealing with a special department of knowledge. If we were to have a history of scientific progress in the new world during the last four centuries, it would probably be the product of such collaboration.

In compiling such a history, it would be necessary at the outset to draw a line of partition between such scientific research as, though conducted on this side of the Atlantic, was due to European initiative. In geography, for instance, the services of Columbus belong, in the main, to Europe, and of European countries, Spain has the best claim to the honor of them. But where, after his primal discovery of cis-Atlantic land, he chose fresh starting points for exploration and thus enlarged his knowledge by its growth on American soil, America may at least share in the distinction. Again, whatever additions to geographical knowledge or natural history were made under the auspices of viceroys or governors after the settlement and political organization of the West Indies and of South, Central and North America, may fairly be set down to the credit of American science. What is not American is Spanish, French or English, or less frequently, Portuguese, Dutch or Scandinavian.

The gathered facts which, after due sifting, amendment and classification, might be accepted as of scientific value, relate to geography, geology and mineralogy, meteorology, botany, anthropology, philology, mythology and folk-lore. Some of these terms were not in use in the early generations of American settlement; nor of science, in our modern sense, was there, apart from pure mathematics, and